WHAT IS CLAIMED IS:

1. A process for producing a rod lens array comprising the steps of:

providing an aligning tool having a plurality of grooves formed side by side;

placing gradient index rod lenses in alignment with each other within the grooves at an average spacing of 1 μm - 5 μm;

fixing the gradient index rod lenses to form an integral unit as they maintain the aligned state; and

polishing end faces of each rod lens.

2. The process according to claim 1, further comprising, between the step of fixing and the step of polishing, the steps of:

removing the aligning tool; and

cutting each rod lens to a specified lens length.

3. A rod lens array obtainable by the process according to claim 1 or 2, which has the gradient index rod lenses aligned at an average spacing of 1 μm - 5 μm.

4. The process according to claim 1, wherein:

the step of providing includes selecting the aligning tool

having a desired pitch of the grooves in relation to a diameter of the gradient index rod lenses to be placed within the grooves.

5. The process according to claim 1, wherein:

the step of fixing includes fixing the gradient index rod lenses onto a frame having a strip pattern of multiple ridges arranged at the same pitch as the gradient index rod lenses thus aligned.

6. The process according to claim 5, wherein:

the strip pattern of the multiple ridges is formed by a photolithographic process.

7. The process according to claim 5, further comprising:

providing a pair of the integral units, each formed according to the steps of providing, placing and fixing;

removing the aligning tool from each of the integral units; and

coupling and fixing the integral units to each other so that the gradient index rod lenses are located between the frames.

8. The process according to claim 1, wherein each of the rod lenses to be placed has a center-line-average roughness of 0.5 μm - 2.0 μm on the peripheral surface.

9. The process according to claim 1, wherein the rod lenses to be placed are such that representative values for the center-line-average roughness on their peripheral surfaces are between 0.01 μm and 0.2 μm as averaged for the whole lens array.

10. The process according to claim 1, wherein the rod lenses to be placed are such that representative values for the center-line-average roughness on their peripheral surfaces are between 0.01 μm and 0.2 μm as expressed by standard deviation for the whole lens array.

11. The process according to claim 1, wherein the rod lenses to be placed are such that representative values for their diameters are between 0.01 μm and 2.5 μm as expressed by standard deviation for the whole lens array.

12. A process for producing a single-row rod lens array, comprising:

a lens arranging step in which a grooved aligning tool having a multiple of shallow grooves formed parallel to each other at a constant pitch is supplied with a multiple of gradient index rod lenses such that they are placed in alignment with each other within said shallow grooves;

a partial burial step in which an impregnating resin sheet

and a frame are placed in a face-to-face relationship with the group of the thus arranged rod lens, then heat is applied to render said resin sheet viscous and pressure is also applied so that the individual rod lenses are bonded to the frame as they are partially buried in the resin and, thereafter, the bonded rod lenses are detached from said aligning tool; and

a complete burial step in which an impregnating resin sheet and a frame are placed in a face-to-face relationship with the partially buried rod lenses in array form, then heat is applied to render said resin sheet viscous and pressure is also applied so that the individual rod lenses are bonded to the frame as they are buried completely in the resin;

wherein a frame with a striped pattern of multiple ridges that extend along the rod lenses and that arranged on the same pitch as the rod lenses is used as the frame in the partial burial step or in both partial and complete burial steps, and the rod lenses are bonded to said frame such that each of them is located between adjacent ridges.

13. A process for producing a two-row rod lens array, comprising:

a lens arranging step in which a grooved aligning tool having a multiple of shallow grooves formed parallel to each other at a constant pitch is supplied with a multiple of gradient index rod lenses such that they are placed in alignment with each other

within said shallow grooves;

a partial burial step in which an impregnating resin sheet and a frame are placed in a face-to-face relationship with the group of the thus arranged rod lenses, then heat is applied to render said resin sheet viscous and pressure is also applied so that the individual rod lenses are bonded to the frame as they are partially buried in the resin and, thereafter, the bonded rod lenses are detached from said aligning tool; and

a complete burial step in which an impregnating resin sheet is placed between two arrays of the partially buried rod lenses such that the rod lenses in one array are in a face-to-face relationship with those in the other array, then heat is applied to render said resin sheet viscous and pressure is also applied so that the individual rod lenses are bonded between the frames as they are buried completely in the resin;

wherein a frame with a striped pattern of multiple ridges that extend along the rod lenses and that arranged on the same pitch as the rod lenses is used as the frame in the partial burial step and the rod lenses are bonded to said frame such that each of them is located between adjacent ridges.

14. The process according to claim 12 or 13, wherein the multiple ridges are formed by screen printing.

15. The process according to claim 14, wherein a coating

is applied to the entire surface of one side of the frame to form an undercoat, and a multiple of ridges are formed on the undercoat.

16. The process according to claim 15, wherein the undercoat is formed by applying one or two layers of a coat having a thickness of 5 - 15 μm, the ridges have a thickness of 10 - 30 μm, and the pitch of the ridges is set at a value near the maximum variation in the diameter of rod lenses that is anticipated in a manufacturing process.

17. The process according to claim 16, wherein the frame is a fiber glass-reinforced plastic laminated plate, and an epoxy resin based coating is used to form the undercoat and the ridges.

18. The process according to claim 16, wherein the frame is a glass plate, and a light-opaque epoxy resin based coating is used to form the undercoat and the ridges.

19. The process according to claim 12 or 13, wherein the multiple ridges are formed by photolithography comprising the steps of applying a resist to the entire surface of the frame, exposing it to light through a mask and etching away the areas that have become soluble.

20. The process according to claim 19, wherein the conditions for resist application and etching are controlled such that ridges 10 - 30 μm thick are formed on the underlying resist blanket having a thickness of 5 - 15 μm.

21. The process according to claim 12 or 13, wherein each of the rod lenses to be placed has a center-line-average roughness of 0.5 μm - 2.0 μm on the peripheral surface.

22. The process according to claim 12 or 13, wherein the rod lenses to be placed are such that representative values for the center-line-average roughness on their peripheral surfaces are between 0.01 μm and 0.2 μm as averaged for the whole lens array.

23. The process according to claim 12 or 13, wherein the rod lenses to be placed are such that representative values for the center-line-average roughness on their peripheral surfaces are between 0.01 μm and 0.2 μm as expressed by standard deviation for the whole lens array.

24. The process according to claim 12 or 13, wherein the rod lenses to be placed are such that representative values for their diameters are between 0.01 μm and 2.5 μm as expressed by

standard deviation for the whole lens array.

25. A rod lens having a center-line-average roughness of 0.5 μm - 2.0 μm on the peripheral surface.

26. A rod lens array in which constituent rod lenses are such that representative values for the center-line-average roughness on their peripheral surfaces are between 0.01 μm and 0.2 μm as averaged for the whole lens array.

27. A rod lens array in which constituent rod lenses are such that representative values for the center-line-average roughness on their peripheral surfaces are between 0.01 μm and 0.2 μm as expressed by standard deviation for the whole lens array.

28. A rod lens array in which constituent rod lenses are such that representative values for their diameters are between 0.01 μm and 2.5 μm as expressed by standard deviation for the whole lens array.

29. The rod lens array according to claim 26 or 27, wherein the representative values for the center-line-average roughness are each a value on a straight line that extends on the peripheral

surface of the lens parallel to its axis.

30. The rod lens array according to claim 26 or 27, wherein the representative values for the center-line-average roughness are each the average of values on different straight lines that extend on the peripheral surface of the lens along its axis.

31. The rod lens array according to claim 2, wherein each of the rod lens has a center-line-average roughness of 0.5 μm - 2.0 μm on the peripheral surface.

32. The rod lens array according to claim 3, wherein each of the rod lens has a center-line-average roughness of 0.5 μm - 2.0 μm on the peripheral surface.

33. The rod lens array according to claim 31, wherein the constituent rod lenses are such that the representative values for the center-line-average roughness on their peripheral surfaces are between 0.01 μm and 0.2 μm as expressed by standard deviation for the whole lens array.

34. The rod lens array according to any one of claims 26 to 28, further comprising:

a resin portion that is integral with the constituent rod

lenses such that it fills the gap between adjacent rod lenses and surrounds all rod lenses.

35. The rod lens array according to claim 8, wherein a frame is fixed to at least one of two outer surfaces of said resin portion that are opposite in a thickness direction of the array.